REMARKS

By the foregoing amendments, Applicants have updated the references to related

applications and revised the Abstract to remove the basis for the Examiner's objection

thereto, so Applicants request that the Examiner withdraw the corresponding objections.

They have also canceled claims 1, 7- 9, 12, 24-37, 39, 42, 49, 51, and 54, amended claims 2,

3, 5, 10, 13, 15, 16, 18, 20, 21, 38, 40, 41, 43-48, 50, 52, 53, 55, and 57-60, and added new

claims 61-69. After the amendment, claims 2-6, 10, 11, 13-23, 38, 40, 41, 43-48, 52-53, and

55-69 are pending.

In the Office action dated October 3, 2005, the Examiner objected to the declaration

for its failure to include the inventors' addresses. Applicants request that the Examiner

withdraw that objection because the applicable Rules provision, 37 C.F.R. § 1.63(c)(1),

applies only if the application was not, as the instant one was, accompanied by an

application data sheet that provides that information.

The invention is directed to an advance in backup-location maintenance of backup

information from which source data can be restored at a source location. U.S. Patent

No. 6,460,055 to Midgley et al. describes an advantageous approach to this task.

Specifically, the prior-art Midgley et al. system monitors writes to the source-data device

and sends the remote location a journal that identifies those locations and the values written

to them.

The approach described in the instant application's specification reduces the

bandwidth that transmitting such backup information requires. As the prior-art Midgley

et al. arrangement does, the embodiments referred to in the specification's paragraph 0046—

i.e., "the embodiments in which the detecting agent includes a file system filter,"—monitor

writes and thereby identify the locations to which data have been written. Unlike that prior-

art arrangement, though, those embodiments are not described as sending the backup

location any content (as opposed to addresses) recorded by that monitoring. Instead, as

paragraph 0048 says, "At storage time, . . . the contents of the changed locations detected by

the detecting agent 465 can be copied from the policy data files 475 stored on the data

storage device 470 to the delta file 590 stored on the backup storage device 570."

That is, although the changed locations are identified whenever writes to them occur,

the contents to be sent in response to such identification are obtained at storage time. This

results in the backup location's receiving the contents of each location whose contents differ

from what they were at the last backup, but it does not result in transmission of intermediate

values; a location whose contents changed more than once since the last backup has only its

last value sent. So the claimed invention enables a backup system to reduce the bandwidth

that transmitting the backup data requires.

Applicants' specification is not the first to disclose keeping transmission bandwidth

that low, but their way of doing so is more efficient than the ways described in the prior art

of record. One of those ways is the approach that U.S. Patent No. 5,999,947 to Zollinger

et al. exemplifies. Zollinger et al. implement their Fig. 1's remote clients 48 in remote

terminals such as laptops that are connected to a server 68 only intermittently. The server

maintains a table 20 of which each remote terminal maintains a copy that gets updated when

that terminal connects to the server. Specifically, a differencing engine 30 generates and

sends to the remote terminal a list 38 of the changes by which given versions can be updated

to later versions. It arrives at the change list by making version comparisons, so it sends no

intermediate values. However, although the Zollinger et al. approach thus saves channel

bandwidth, the processor time required to do so can be prodigious; Zollinger et al. have to

compare complete versions of all the data being backed up.

The prior-art Midgley et al. patent describes an approach that is less computation-

intensive than Zollinger et al.'s but that still does not exhibit the efficiency that the present

invention enables a backup system to provide. As is explained in the passage that begins in

line 66 of Midgley et al.'s column 21 and extends through line 22 of its column 22, Midgley

et al.'s prior-art system includes a coalescence operation. That operation can be used to cull

duplicates from the journal that results from monitoring writes to the disk. Specifically, that

operation identifies the locations that the journal lists more than once, and, for such

locations, the system dispenses with sending any journaled contents but the last.

In contrast, although embodiments of Applicants' invention may use coalescence for

other purposes, it does not require coalescence in order to keep transmission bandwidth low.

This is because at storage time it merely obtains from, say, the source files themselves the

contents of those locations that the journal has identified as written to, and it sends only

changed contents thus obtained. So Applicants' invention enables the backup system to

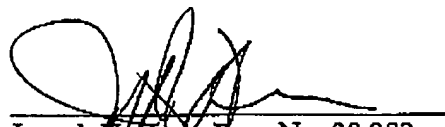achieve low transmission bandwidth more efficiently than the prior art does.

As amended, all of Applicants' independent claims define this advance. Claim 61,

for example, recites that, although it is "by monitoring writes to files in the source storage

system since the previous storage time" that the there-defined method "identif[ies] locations

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in the source storage system where changes have been made since that previous time," what

it stores in the backup storage system in response are "contents that at that storage time

occupy locations thus identified." The other independent claims include similar limitations,

so they all define patentable subject matter, as do the dependent claims, at least by virtue of

their dependence on the independent claims. Applicants therefore request that all claims

remaining in the application be allowed.

                                         Respectfully submitted,

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